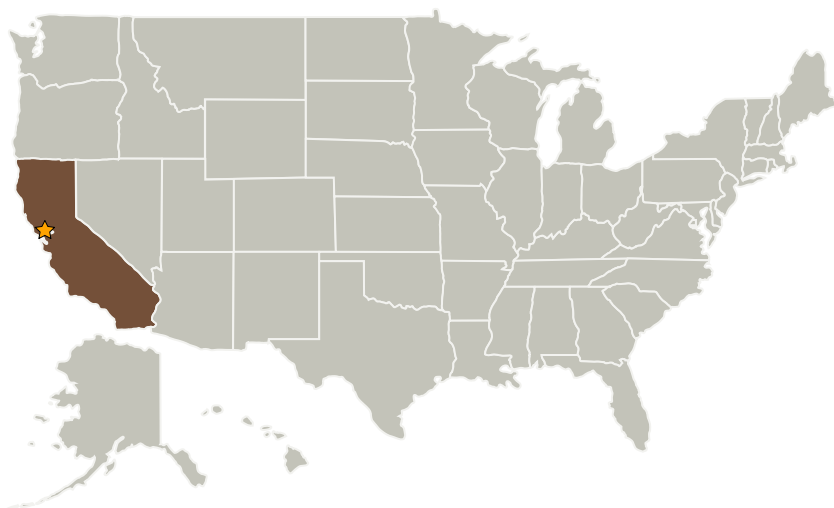## Project Introduction

Next generation air traffic management systems will be based to a greater degree on predicted trajectories of aircraft. Due to the iterative nature of future air traffic management algorithms, the success of these systems will depend strongly on the ability to rapidly generate trajectory predictions. By combining algorithmic improvements and high-performance computing hardware, Phase I research demonstrated significantly accelerated prediction of high-fidelity aircraft trajectories using the NASA-FACET software. Phase II research will build on the Phase I feasibility demonstration results to develop a full-scale computational appliance for rapid prediction of aircraft trajectories (CARPAT). The proposed architecture will combine the trajectory and airspace modeling capabilities of the FACET software with commercial, off-the-shelf high-performance computing technology. High-speed trajectory predictions and iterative computation of traffic flow management algorithms will be demonstrated under realistic traffic scenarios. The trajectory prediction appliance will commercialized during the Phase III work.

Anticipated Benefits

Potential NASA Commercial Applications: The hardware and software technology elements of the CARPAT system have several commercial applications. The high-performance computing hardware can be used in applications such as Bio-Informatics to accelerate pattern matching, automatic target recognition and multi-target tracking. It can also be used in flight simulation and real-time signal processing.

Primary U.S. Work Locations and Key Partners

Computational Appliance for Rapid Prediction of Aircraft Trajectories, Phase II

Table of Contents

Organizations Performing Work	Role	Type	Location
⭐Ames Research Center(ARC)	Lead Organization	NASA Center	Moffett Field, California
Optimal Synthesis, Inc.	Supporting Organization	Industry Small Disadvantaged Business (SDB)	Los Altos, California

Primary U.S. Work Locations
California

Project Transitions

▶ **February 2008:** Project Start

✔ **February 2010:** Closed out

> **Closeout Summary:** Computational Appliance for Rapid Prediction of Aircraft Trajectories, Phase II Project Image

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Ames Research Center (ARC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

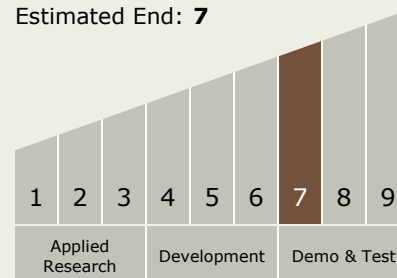# Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Padmanabhan K Menon

Technology Maturity (TRL)

Current: **7**
Estimated End: **7**

1	2	3	4	5	6	7	8	9
Applied Research			Development			Demo & Test		

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Technology Areas

Primary:

- TX15 Flight Vehicle Systems
  └ TX15.2 Flight Mechanics
    └ TX15.2.1 Trajectory Design and Analysis